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The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

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Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

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Case Studies In TRIZ – Clothes Peg

Part 3: Migration To Super/Sub System

In the first two parts of this clothes-peg series (e-zine issues 53 and 54) we have been making the assumption that any solution we end up with will a new design of peg. In this third and final part we take a step back and begin thinking about the bigger picture. In this bigger picture view our previous focus on the peg may turn out to be a pretty big assumption. Of course, if our constraints mean that we wish to stay in the peg business then we might have no choice. On the other hand, if we think about the peg from the perspective of Ideal Final Result – a very good way of forcing ourselves to think about the bigger picture – we are quickly going to home in on the idea of the 'ideal peg' as being 'no peg'. The clothes, in this big picture scenario, should attach themselves to the line.

We can (and ought if we're seriously in the clothes drying business) take even this concept a step further by thinking about the even bigger concept of the clothes not needing to get wet in the first place. Figure 1 illustrates a means of plotting both of these concepts onto a single picture. The basic idea behind it is that the cone should represent the domain of all possible solutions to the 'clothes drying' function. In order to map everything in this domain, we ought to both examine the IFR and work backwards, and then examine all of the components present in today's system and extrapolate them forwards.

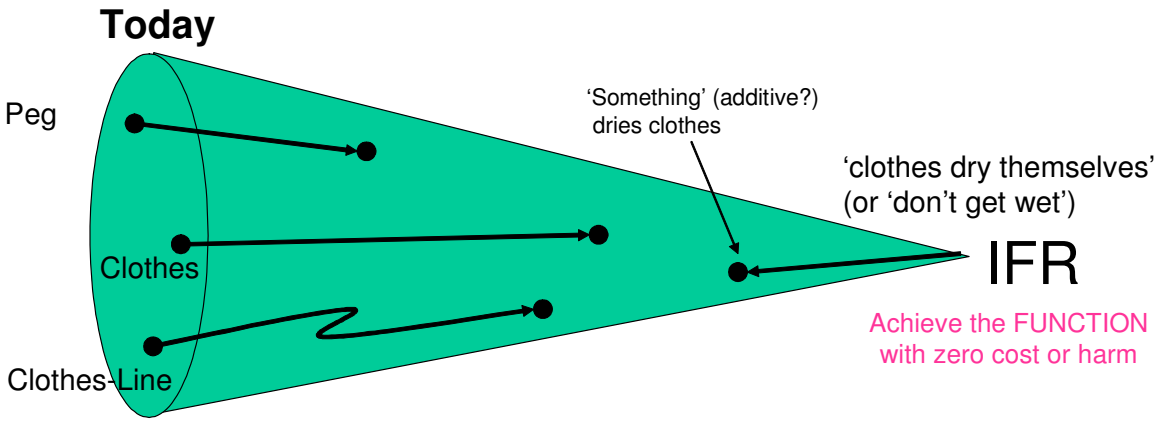

Figure 1: Clothes-Drying IFR Map

Strictly speaking, we also ought to consider the possibility of other clothes drying means that might exist or be created using existing technology (microwave for example), but what we have plotted here should be sufficient for the purpose of describing the generic process.

Considering the evolution of the existing components towards the Ideal Final Result state, we are going to eventually see the disappearance of each of the elements present in the current system. Given the presence at this point in time of clothes, line and peg, it seems likely that the peg will be the first thing to disappear. The clothes will be the last to disappear (since if they disappear the whole functional need for drying them disappears). If the line disappears, then there will be nothing for the peg to attach the clothes to. So, if the peg disappears (the 'ideal peg'), and we are left with just clothes and line, then either the clothes must somehow stick to the line, or the line must stick to the clothes.

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Given then that today's clothes don't stick to clothes-lines, and that it will be far easier to change the line than everyone's wardrobe of clothes, it seems likely that the line will be the system to change.

If it does change, it needs to become able to 'stick' to the clothes. Not only that, but, using the 9-Windows modeling framework, there is going to be a time when we are going to have to get the clothes *off* the line again. Figure 2 shows a partially completed 9-Windows analysis.

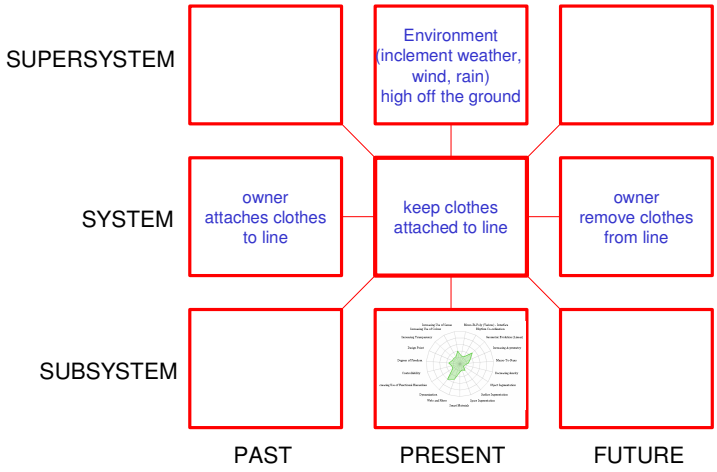

Figure 2: Partial 9-Windows Analysis Of Clothes-Line/Clothing System

This shifting requirement over time very clearly indicates the existence of a contradiction: we want it to be easy to attach the clothes; we want them to stay attached no matter what the environmental conditions; and then when the clothes are dry, we want it to be easy to remove the clothes from the line.

We could, at this point, chose to examine this contradiction in more detail. Alternatively, as can be seen from the 'sub-system' box, we have completed an evolution potential analysis of a typical current design of clothes-line, and could therefore examine whether any of the untapped potential might provide some clues to a potential solution. In simple terms, given the comprehensive way in which the trends have been designed, if there is any hope that the clothes-line will be able to take on the 'join', 'hold' and 'detach' functions, the answer ought to be found somewhere in the untapped potential. Figure 3 presents a closer look at the current clothes-line evolution potential.

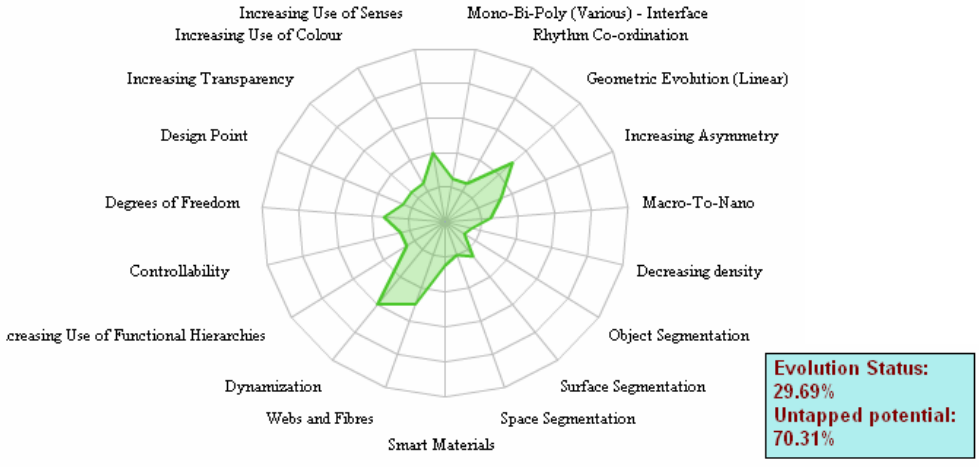

Figure 3: Clothes-Line Evolution Potential
(picture from EvPot+ software)

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At the very least, what this plot suggests is that clothes-line design has not advanced too far along any of the trends. There is therefore considerable untapped potential to evaluate. To help structure the process of analyzing this untapped potential, we can examine the 'reasons for jumps' associated with each trend stage in order to see if any of the jumps have in the past been related to improved attaching, holding or releasing. And preferably all three.

Doing this suggests that Surface Segmentation, Smart Materials and/or new trend 'Increasing Functional Hierarchies' look like the most likely candidates, with Asymmetry, Geometric Evolution and Dynamization as long-shot outsiders.

If none of these trends suggest any ideas by themselves, we could use the trend stage descriptions to help formulate a search of the patent or function database. This is a good strategy for finding other problem solvers that have used similar trend-jump strategies to solve similar problems. Figure 4 shows the sort of search string we might use to interrogate the US patent database for patents that might have made use of the Surface Segmentation trends:

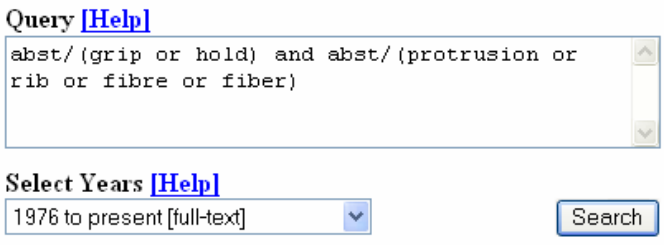
Query [Help]
abst/(grip or hold) and abst/(protrusion or rib or fibre or fiber)
Select Years [Help]
1976 to present [full-text]
Search

Figure 4: US Patent Database Text String For Trend-Guided Search

Through the Function database, it doesn't take long to make a match between the 'join' problem and the surface segmentation trend. Figure 5 illustrates the gecko foot grip solution; an apparently effective way of creating a high gripping force that can easily be switched on and off.

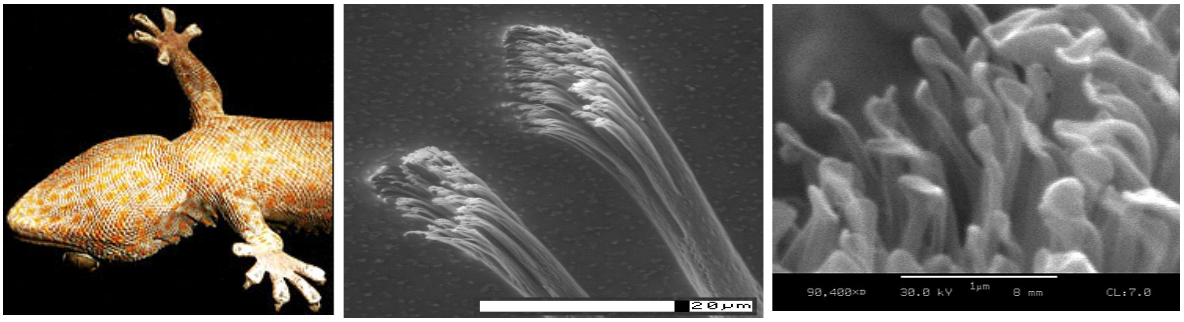

Figure 5: Gecko Foot Solution To The 'Attach'/'Detach' Function Using Surface Protrusions

This appears to be quite an interesting concept. We could decide at this point to dig a little deeper into the potential of this solution. Or we could continue our search for other possible solutions.

As far as the point of this article is concerned, we need not do either since our objective is to focus on points of practice and procedure. It is our proposal that the IFR solution map (Figure 1), 9-Windows and Evolution Potential tools are all essential elements if we are to take the broadest possible perspective on the solution of inventive problems. The IFR map in particular is an excellent way of forcing ourselves to examine the big picture in a comprehensive manner.

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Looking at this specific case, it is our suspicion that the answer to the clothes-peg problem is that it will disappear and its function will be taken over by the clothes-line in a timescale short enough that the motivation to design a better peg is pretty low. Whether the gecko-foot solution is practical remains to be seen. Interested readers may care to take a look at the patent database and explore other possible attach/grip/release solution possibilities. Everyone else may wish to continue onto the next article which has more to say about clothes-pegs and problem-definition/solution-generation processes in general.

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Why ARIZ And Other Schemes Don't Work

(The Fallacy Of Sequential, Step-Wise
Inventive Problem Solving Processes)

While we were working through the initial stage of the clothes-peg case study presented earlier in this and previous issues of the e-zine, here's an approximation of what actually happened:

Person A: Let's re-design the clothes-peg. (1)
Person B: To do what?
A: Make it simpler to hang out washing.
B: What's wrong with the current designs?
A: Well, I was thinking about it. One thing is they require two hands. One to hold the clothes; one to hold the peg.
B: So you think we need a one-handed pegging system? (2)
A: Something like that.
B: That means that one hand must be able to hold the peg and the clothes. At the same time.
A: Maybe. Sounds like a contradiction if that's the problem.
B: We want to increase ease of use or convenience, but there are too many things to hold?
A: And they could all be different sizes. Socks. Sheets. Etc. Area.
B: Matrix?
A: Matrix. Here we go. 35, 1, 13, 17, 14. 4, 12, 2. (3)
B: We need to get something around the clothes-line to grip. Holding it in the same hand as the clothes.
A: Needs to stick to the hand?
B: Curls around thumb? Principle 14. (4)
A: Sticks by itself? (5)
B: Or. We should think about IFR (6). No peg. The clothes stick by themselves?
A: The line sticks by itself? (7)
B: Self-fastening clothes-line. (8)
A: We need to get the clothes off again though. (9)
B: The next contradiction already.
A: We want the line to stick and not stick. (10)
B: Separate on condition? Stick when clothes are wet, then release when dry?
A: And fall on the ground.
B: Maybe not. Finger temperature?
A: Shape-memory! (11)
B: Cold day though. Cold hands. (12)
A: You won't put the clothes out on a cold day. (13)
B: Hmm.
A: So what then? Post-It Glue? Re-usable? (14)
B: We should go and have a look at the Function Database. 'Join'. Or 'un-join'. 'Separate'.
A: Join. Lots of possibilities. Vacuum? (15)
B: Too complicated. (16)
A: Magnets? (17)
B: Magnetic line? (18)
A: And magnetic peg. That might solve the one-handed problem. (19)
B: Maybe. Heavy though? Another conflict. (20)

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A: How much force do you need? (21)
B: Let's look at it later. Come back to the Database. What other ways? (22)
A: Static? (23)
B: Nope. (24)
A: Here's one. Gecko! (25)
B: Gecko?
A: Gecko foot. Sticks to anything. Then comes off again. Walking across ceilings.
B: Mmm.
A: It's brilliant. Gecko-line!
B: Sounds too good. It'll damage the clothes. Not enough grip. (26)
A: No it won't.
B: How do you know that? What do you know about gecko feet?
A: I think it'll work.
B: Hmm.
A: And even if it doesn't, we just have to solve the contradiction. (27)
B: Hmm. I like the magnet better. (28)
A: Force versus something. Reliability? (29)
B: Durability?
A: Flexibility?
B: I still prefer the magnet idea. (30)

We think this is fairly typical of what happens at the 'fuzzy front-end' of a problem. It is necessary for problem solvers to, as architects describe it, 'find their way in' to the situation. During this activity, there appears to be considerable to-ing and fro-ing between problem defining and solution generating modes. In fact if we look in detail at the sequence of events through the lens of such shifts, we see something like the graph shown in Figure 1.

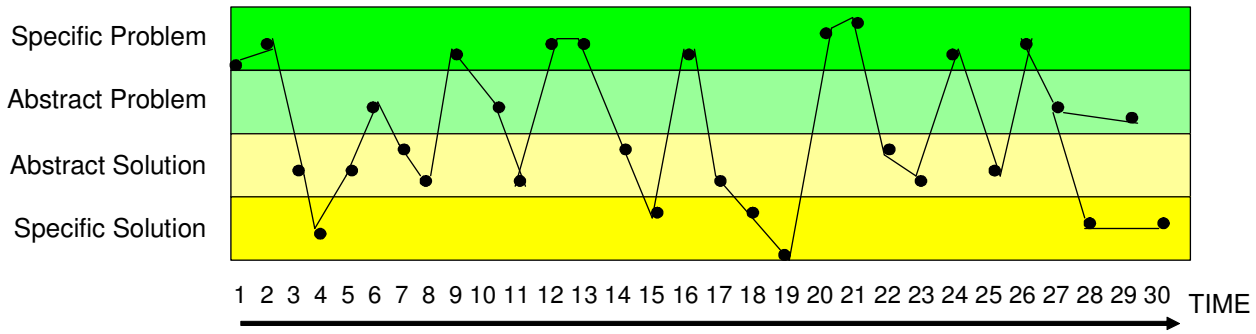
Specific Problem
Abstract Problem
Abstract Solution
Specific Solution
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
TIME

Figure 1: Oscillation Between Problem Definition And Solution Generation

The numbers in the figure relate to the orange numbers in the earlier script. What we can also see in the figure is that we can further sub-divide both definition and solution tasks into 'generic' and 'specific' regions and that we then see two people oscillating frequently between all four different levels of thinking.

If we agree that this kind of scenario is realistic – and certainly 'wicked problem' expert Jeffrey Conklin would say it was (Reference 1) – then it has something fairly important to say about attempts to construct step-wise and sequential problem solving systems. Perhaps the most important is that they won't work.

We think the evidence that it doesn't work is everywhere. Perhaps it is most apparent in the software domain; where the phenomenon of customer's not knowing what they wanted until they see the first prototype, and then realizing they wanted something extra, or

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something completely different, is the bane of the software engineer's life. But just maybe this is a fundamental part of the way the brain works. We need to see something before we know whether it was what we wanted or not.

The brain is a wonderful instrument, but it seems to possess a number of characteristics that fight hard against attempts to impose fixed ways of doing things. For one thing, most people's brains seem to be much happier in 'solution generation' mode than in 'problem definition' mode. Once we get some kind of a clue about solving a problem, in other words, we are magnetically drawn towards exploring that solution even if we ought to still be in definition mode.

So here's the blinding flash of the obvious (BFOTO#2356!) that we've somehow managed to fail to adequately put across before: *Step-wise processes won't and can't work, so therefore don't try and create them.*

In our defense, we have long been conscious of the oscillatory nature of working on inventive problems. Our problem explorer, for example, informs the user that it doesn't matter what order the template sheets are completed. And the architecture of the CREAX Innovation Suite – designed by us – was heavily driven by a desire to allow the user to switch easily from one tool to another. Having said that, it is probably fair to say that we have failed to sufficiently press home the importance of the message.

The tide of other methods also works against us, for seemingly every other problem solving scheme has fallen into the same psychological inertia hole. The hole that says there must be a process, and that processes must follow a one-two-three-four sequence. Perhaps the worst offender of them all is ARIZ. From its initial inception through all of the myriad versions to software tools like Ideation's IWB there has been the implicit assumption that problem solving procedures must be step-wise and sequential.

A New Contradiction And Its Solution

So now we have a new contradiction: how to be simultaneously both systematic and non-sequential. Well, we made a first step when we designed the problem explorer to be filled in an 'any sequence' the user desired. But it doesn't go far enough. It doesn't go far enough because it doesn't give the user the 'permission' to jump out of problem-definition mode thinking into 'solution-generation' mode. It's what we do in our in-house practice though, and we suspect it's what happens to many users also. But we have never explicitly come out and said 'whenever you think you have found an interesting problem, feel free to jump across to the solution generation part of the process'.

The whole point of the structured problem-definition scheme thus becomes the desire to put all of the available definition strategies together (into a linear sequence if so desired) in such a way that, whenever a jump to solution generation occurs, we know where we were in the definition process, so that we can return to the place we left and then continue working through the other remaining definition tools.

The basic idea looks like the scheme illustrated in Figure 2. Each of the white rectangles represents one of the problem explorer templates. Or one of the TRIZ/systematic innovation portfolio of tools.

Since we've been using versions of this Figure 2 scheme with our clients we have found considerably less frustration during live problem solving sessions. We've also noted that problems have been solved with 'satisfactory' (as deemed by delegates) in much shorter

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periods. In one particularly striking case, we were filling in the very first 'where are you trying to get to?' sheet, realized there was a conflict between what management wanted and what the customer wanted, transferred that problem onto the (business) Matrix and ten minutes later had our desired breakthrough solution.

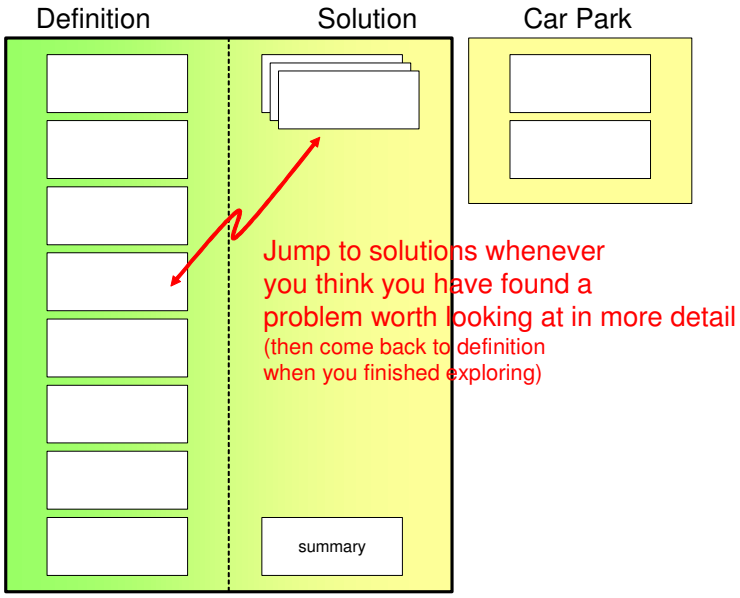

Figure 2: Revised Inventive Problem Solving Process Allowing Oscillation Between Definition And Solution Modes

What we're still working on is re-sequencing the template sheets. Our initial aim has been to encourage users to select the templates in a random or 'when you feel ready for it' manner. So far the one-two-three-four process psychological inertia problem has meant this hasn't worked outside the realm of our internal team (we practiced longer!). So the re-sequencing activity at the moment is trying to assemble a structure whereby the further down the template pile the user gets, the more detailed the sheets become. This has the advantage of allowing us to put the Function & Attribute Analysis sheet near the bottom of the pile (we hate FAA; despite knowing its importance). Others would, of course, put this sheet and this tool at the top of the pile. Neither approach is right or wrong. Both are right depending on the particular circumstances of the time available, knowledge of the problem team and no doubt a range of other factors.

We never achieve an 'optimum' (horrible, enemy word!) sequence, but so far arranging by degree of difficulty seems like a good option. Particularly, it seems, for newcomers. Hopefully one day the problem will disappear completely and users will have convinced themselves that one-two-three-four step-wise sequences don't work and that therefore they have to learn how to do things in different ways. Ways that are simultaneously simple and complex.

References

1) Conklin, J., 'Dialogue Mapping', John Wiley & Sons, November 2005.

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Not So Funny Pt 236: Sharp VCR/DVD Recorder Combination

My father recently bought a new VCR player. That in itself is not so funny. For too many reasons to mention here. Okay, so the unit did come with a DVD recorder too. In theory, therefore, all of those old videotapes could have been transferred to sparkly new DVDs. But first there was a need to tame the new beast.

This, then, from the 84 page user guide for the latest Sharp VCR/DVD Recorder product. Before we get to the dizzy heights of transferring tape onto DVD, just in case you ever want to record something using the timer, here are two of the 14 steps and two pages of description required to achieve what you want:

Step 9: Press < or > to select “REC TO” and press **ENTER**. Select the media (DVD or VCR) you want to record onto from the list and press **ENTER**.
:
:
:
Step 14: Press **TIMER REC**. The timer indicator “◙” will appear on the display and the unit enters standby for recording.

- if the program is set for DVD recording only, the unit will change to VCR mode automatically. (DVD mode cannot be selected.)
- if the program is set for VCR recording only, the unit will change to DVD mode automatically. (VCR mode cannot be selected.)
- If the programs are set for DVD and VCR recording, the unit will turn off. If you want to use the unit, press **TIMER REC** again to de-activate the timer.
- If the clock symbol (◙) blinks on the display, and “TIMER RECORDING ERROR PLEASE CHECK THE DISC OR TAPE.” appears on the screen even though you have pressed **TIMER REC**, the cassette may not be loaded or no disc space is available.
- If the cassette is ejected even though you have pressed **TIMER REC**, the erase prevention tab of the cassette may have been removed. (See page 46.)

Huh?
Could you say that again please? In Step 9 I select whether I want to record on DVD or VCR. Then in Step 14 whatever medium I’ve selected I can’t have. Really?
Surely some mistake?

Actually several mistakes. First off having an 84 page user manual. Second off in needing 14 steps to do anything (unless it’s operate a space shuttle). I know, I know, no-one is supposed to read the manual. But I tried programming the damn machine using the ‘instinctive’ way and failed. Following the above instructions to the letter, and sure enough if you select ‘VCR’ the stupid machine will try and switch to ‘DVD’ when the time comes for it to automatically switch on. Which in turn means that if there is no DVD in the machine you’re not going to be watching that all important programme afterall.

Which in turn means the designers at Sharp have completely taken leave of their senses. Or the design was approved on April Fools Day. Either way we suggest you enroll on the three-week Sharp user training programme before considering buying one of their stupid machines.

We are, meanwhile, happy to offer a free workshop on Gemba, Voice of Customer or customer empathy to any Sharp engineer.

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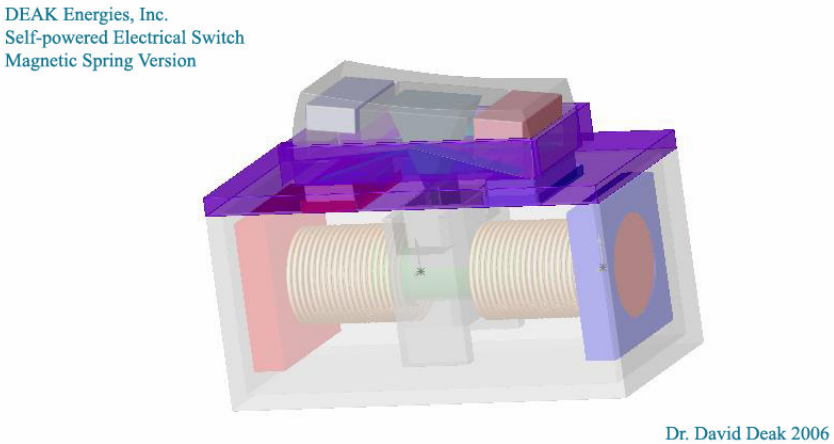
Patent of the Month - Self-Powered Remote Control Device

Patent of the month this month is European Patent 1704548, granted to US-based, UK-born inventor, David Deak. The patent was granted on 27 September. The invention disclosure describes a self-powered remote control device. The invention appertains generally to switches and more specifically to a remote switch that produces its own power. The world of consumer electronics is, of course, crammed full of remote switching devices from garage-door openers to TV remote controls. The vast majority of these devices are powered using batteries. In some systems a move towards solar-cells can be observed. Both come with inherent problems; the first with the annoying need to replace the battery; the second with the need for the user to remember to place the device such that it is able to receive sufficient sunlight. Both ultimately present problems of inconvenience.

Dr Deak's invention replaces both of these systems with one that makes use of another existing source of energy. Through cunning deployment of a piezoelectric transducer, the switch is able to convert user-provided mechanical energy into sufficient power to send the appropriate switching signal. Specifically, the devices need only the normal effort that a user would have anyway made to flick the switch. A 'free resource' in the absolute sense of the word.

TRIZ researchers have long talked about the likely trend towards more efficient use of the energy resource that surrounds the behaviour of humans. An early example is the shoe-mounted piezoelectric devices capable of converting the mechanical energy present when we walk into sufficient power to charge a mobile phone. That device carries with it the difficulty of transferring power generated on the move at ground level to potentially stationary devices at hand height and above. Dr Deak's solution looks like the first to offer a practical energy conversion system. According to the invention disclosure, the amount of energy required to physically move a switch is more than sufficient to transfer the required control signal with associated encoding and decoding circuitry to whatever remote device is being controlled. Thus energy is only required to be supplied at the moment when a signal is to be sent. For the rest of the time, the device can be totally passive.

This is one of those inventions that prompts us to get in contact with the inventor to establish whether it can really be true. We were very happy, then to receive a comprehensive reply from Dr Deak, including pictures of what turns out to be a whole family of switch designs. Below is a sample drawing of one of the designs; in this case for a simple two-way switching device.



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Production prototypes are already in operation, dimming options are designed and in process of prototyping. Negotiations are apparently also well progressed with a number of potential licensees in the UK. This is perhaps no great surprise given the immediately apparent advantages:

* Requires no batteries or any external source of power for the switch component
* The receiver part, which is embedded within the lighting fixture can be used anywhere in the world without concern for voltage and line frequency variations.
* Eliminates from 50% to 70% of the labor and electrical wiring used by conventional "wired in" switches.
* Price competitive by comparison to "wired in" costs.
* Can be programmed as a smart switch.
* Operates up to 1000 meters indoors or outdoors, through walls etc. Distance can be increased with an optional battery-less, wire-less relay transceiver unit.

Currently identified applications include Consumer, Industrial and Commercial electrical power wall and power switch replacements, home and apartment intercom and door bell switch replacement, security systems, garage door openers, car door locks, hospital and residential home applications.

Readers might also like to check out some of Dr Deak's extensive range of other activities, not least of which is a 35 year life in physics and a parallel career as a celebrity-collected artist. Here is a person for whom the expression 'renaissance-man' was invented. Here are some of the good Dr's websites:

http://my.opera.com/drdeak

http://yessy.com/drdeak

http://deakworld.com

http://deakspace.blogspot.com

Also of interest are some of the old NASA experiments Dr Deak designed and performed: http://www.youtube.com/watch?v=94KzmB2bI7s#GU5U2spHI_4

It is often said that some people think in naturally TRIZ-like ways without ever having heard of TRIZ. Dr Deak seems like just such a person. His latest patent represents a wonderful example of using existing resources. In so doing, we think there is the potential here to completely transform the switching world. And that doesn't happen every day. Watch this space.

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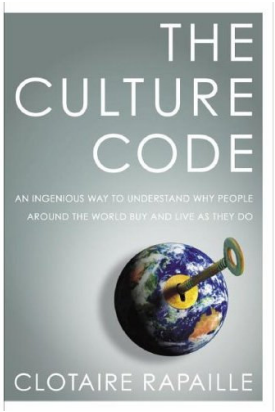
Best of the Month – The Culture Code

An easy decision this month since ‘The Culture Code’ by US-based French-born marketeer Clotaire Rapaille is one of those books that we think will have an immediate impact on systematic innovation. Although far from perfect (a recent article in Fast Company – Reference 1 – described Rapaille as the originator of "the soft porn of irrationalism."), there is some highly thought provoking material here.



Rapaille’s theme is essentially simple; our first exposure to something leaves a context-loaded image in our conscious and then unconscious mind. Subsequent exposures to whatever the something is will be connected back to that initial priming image. By way of example, the book starts with the somewhat difficult to believe claim that Rapaille was responsible for the rejuvenation of the Jeep brand in the US when he suggested that a square headlight design should be replaced by the original round design found on the original army transport vehicle. The reason this worked? In the US the first-exposure primed code for Jeep turns out to be ‘horse’, and horses don’t have square eyes. In other words, when people observed a square-headlighted Jeep it presented an image that was inconsistent with the initial priming image and therefore, irrespective of what their conscious mind told them, they were inclined to reject the square design.

If this sounds a tad preposterous it probably is. But then again, we think there is definitely something in the idea of subconscious priming following an initial exposure to something. The remainder of the book very definitely heads into more compelling and convincing territory. The ‘priming’/’culture-code’concept is totally consistent with another important text in our most recent ‘intangibles’ research, The Fourth Turning by Strauss and Howe (Reference 2). Certainly there is more substance in Rapaille’s theories and suggestions than we’ve ever been able to extract from a so-called emotional-design ‘method’ like Japanese-originated Kansei.

Take a pinch of Strauss and Howe, a pinch of Rapaille, a healthy dose of Spiral Dynamics, TRIZ Contradictions and we think something important is going to emerge in the ‘design for intangibles’ world. Hopefully we will have more to say on this important emerging are in future issues of the e-zine. In the meantime, at the very least, the codes uncovered by Rapaille offer some intriguing insights into the design of better products, services and marketing strategies.

Finally, then, another small criticism of Rapaille’s book is that it never actually puts all of the codes together in one place. It really helped us to see some kind of bigger picture when we assembled them into a single table. That table is presented below. Hopefully readers will be intrigued enough by some of the connections to want to go and read the book for themselves. Read the book with an open mind and it might just cause a number

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of apparently strange market successes and failures of recent times to suddenly become very clear indeed.

Subject	Culture Code (& country – US unless otherwise labeled)	Page in book
Jeep	Horse Liberator (DE, FR)	2 3
Toilet paper	Independence	5
Cheese	Alive (FR) Dead	25 25
Car	Identity Engineering (DE)	26 26
Love	False Expectation	39
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Conference Report – Infovision, Bangalore

Initiated in 2005, InfoVision is a premier annual global Summit in India for the Knowledge Industry and Knowledge community. The 2006 conference was held in Bangalore on 28 and 29 September. The event, which this year had the theme of 'knowledge content and community, methods and models'. The event was attended by close to 200 delegates from across the country and beyond. Probably around 5 people falling into the 'beytond' category. InfoVision is intended to be an intellectual confederation of academia, industry, government. The aim is to meet as partners and to develop a unified framework for and formulate strategies for capitalizing knowledge for performance.

The event saw presentations from over 30 internationally known thought leaders such as Jimmy Wales (founder of Wikipedia), Leif Edvinsson, Sam Pitroda, Peter Lor, Shoba Purushothaman and Rory Chase. Sessions on Enterprise Content Management, Managing Intellectual Property, Business and Competitive Intelligence, Wikis, Blogs, Collaborative Tools and Models. The overall programme can be found at http://www.infovision.org.in/html/program.htm.

We were there to talk about TRIZ and its impact on knowledge management and intellectual property. The large proportion of the talks and lively delegate questions, on the other hand, seemed to centre around a recurring theme of 'there is a massive amount of information out there, and it is increasingly impossible to hope to manage it all'. This turned out to be a wonderful opportunity to use TRIZ as a way of shifting the focus away from how much information there is, to how much of it turns out to be just noise. In other words, although the amount of information continues to rise exponentially, the amount of knowledge rises only relatively gently. Taken a step further and the conference further suggested that the amount of wisdom (knowledge-times-context) was static if not on a downward slope.

Not that this was a symptom observed amongst the delegates. In fact the whole room appeared to be positively humming with intelligence and brain-power. It was especially gratifying therefore when the interest in TRIZ after the presentation was so high. I don't think I've ever collected so many business cards in so short a period of time. It seems that the TRIZ solution to the signal-to-noise ratio information and knowledge management problem touched a collective nerve. Given that many in the audience had at least heard of TRIZ before the presentation, it is interesting to note that the connection to knowledge management had not previously been made by the vast majority. Whether this is a fault of TRIZ or the Indian KM community remains to be seen. In the meantime, I have a sneaking suspicion that the link has now been made very clear indeed.

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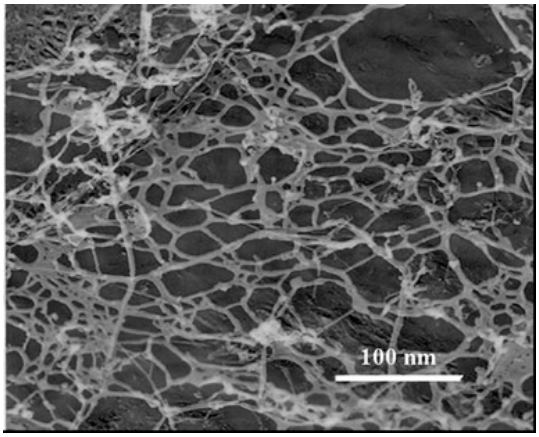
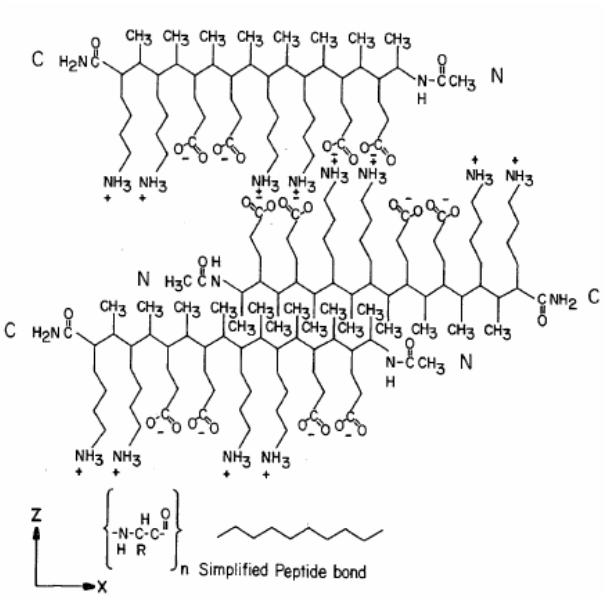
Investments – Self-Assembling Gel
(thanks to Ellen Domb for pointing us towards this one)

The October 10 issue of Nanomedicine featured this intriguing means of stopping bleeding. The researchers at MIT claim they have developed a clear gel that covers an injury and immediately stops bleeding. To date, the gel has only been tested in rodents, and no one knows whether it will work in humans. But if it does, the product could turn out to be a major advance for both surgeons and ordinary people.

"If you are out camping, and you cut your hand, you could carry a tube of this and squirt it on your hand and stop bleeding," explained Rutledge Ellis-Behnke, an investigator at the Massachusetts Institute of Technology and lead author of a new study on the gel.





While doctors have devised ways to stop it, bleeding remains a serious challenge during surgery. The new gel offers the potential to replace the currently used solutions, each of which presents the user with a number of limitations, either in terms of ineffectiveness or collateral damage:

- Compression -- the same approach used to encourage blood clotting in a nosebleed or paper cut -- is the simplest and often least effective strategy.
- Cauterization -- frying the ends of blood vessels -- is another. Although immediate, this method can lead to localised cell damage.
- Surgeons also turn to clot-boosting drugs and even use the main ingredient in "Super Glue" to close wounds.

Ellis-Behnke and his colleagues accidentally came across another possible solution while testing ways to reconnect severed parts of the brain. "We noticed that all the bleeding stopped in the brain when we put the material in," he said.

When the liquid, composed of protein fragments called peptides, is applied to open wounds, the peptides self-assemble into a nanoscale protective barrier gel that seals the wound and halts bleeding. The researchers have so far tested the gel on hamsters, using it to treat wounds to the brain, liver, spinal cord, muscle and femoral artery.

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The researchers, from MIT and Hong Kong University, found the gel worked within 15 seconds to stop bleeding.

Later, the gel -- which is clear and looks like water -- disintegrates into amino acids, the building blocks of proteins.

According to Ellis-Behnke, the gel could potentially be used to stop a variety of kinds of bleeding. "In every surgery, about 50 percent of the time is spent controlling bleeding. If you could use this in a lot of those surgeries, you could reduce the time it takes to do the surgery and reduce the amount of blood you have to put in that person," he said.

He added that the gel might even help preserve severed limbs by reducing bleeding as they await reattachment to the body, he said.

The next step is to test the gel on a larger animal, pigs, Ellis-Behnke said. He estimated it may take three to five years before the product reaches the human market.

As for the cost, Ellis-Behnke doesn't expect the gel to be very expensive.

The NanoMedicine article arrives in the wake of the granting of US patent 7.098,028 on 29 August. The invention disclosure reports; “A small peptide termed EAK16 (AEAEAKAKAEAEAKAK, aa 310-325 of SEQ ID NO: 2) was discovered serendipitously to self-assemble into stable macroscopic membranes and filaments in the presence of millimolar concentrations of salt. This invention relates to the self-assembly of peptides into stable macroscopic membranes and filaments.”

The investment opportunity comes through the ‘PuraMatrix’ company set up by members of the MIT research team. The company’s website can be found at www.puramatrix.com/technology/index.htm.

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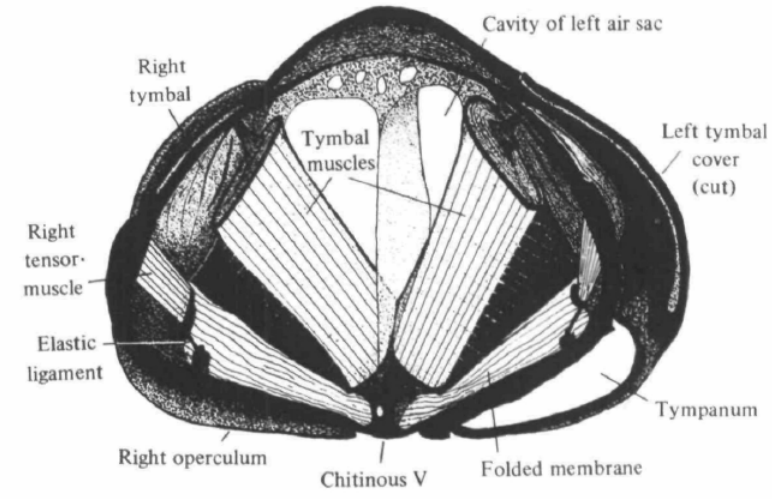
Biology – Cicada

A good way of finding examples of nature solving conflicts is to look at record breaking life-forms. Fastest, biggest, smallest, loudest, etc are all good indications that an interesting problem has been overcome. The focus of this month's biology feature is the winner of the world's loudest award (insect category), the cicada. Some male cicada's are able to create noise levels of up to 120dB. That's verging on the pain threshold for the human hearing system. Quite why cicadas have evolved such a loud call is open to some debate. Certainly mating comes into the story as it is only the males that seek to make such a racket. Warning off potential competitors may be another factor. Either way, our focus is on precisely how a male cicada does what it does.

The field has been researched fairly comprehensively it seems. The best paper would appear to be 'The Evolution Of Fibrillar Muscles In Insects' by J.W.S. Pringle from the University of Oxford (Reference 1). The following text reproduced from Dr Pringle's discussion:

> The easiest system to understand is cicada timbal sound production, where there is no antagonist to the timbal muscle and re-extension is achieved by the elastic mechanism of the timbal. The sound-producing timbals are situated on the dorso-lateral part of the 1st abdominal segment. The timbal is an elaborately ribbed cuticular membrane which clicks suddenly like the lid of a tin can when the tension on the muscle apodeme reaches a certain value, producing a pulse of sound.

And here is one of the good doctor's pictures:



Key to the story is the progressive tensioning of the 'tymbal' by the insect's muscles, the results of which is a sudden flip from convex to concave when the tension reaches a certain threshold level. Muscles are not so good at very rapid motions, whereas production of a loud noise is very definitely helped by such motions. The cicada thus solves the problem by buffering the applied tension in a curved, bi-stable structure.

From a conflict resolution perspective what is happening here is that the desire to create a loud noise is hampered by muscle contraction speed. There is also the issue, prevalent across all of nature, that we require maximum energy efficiency. We can map these conflict pairs onto the 2003 Matrix as follows:

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Improving Factor	Worsening Factor	Principles
Noise (29)	Energy used by Moving Object (16)	19 28 4 35 14 24 23 9 3
the cicada wants to make as loud a noise as possible, but wants to limit the amount of energy it uses to achieve it		
Noise (29)	Speed (14)	3 1 14 31 39 24 4
the cicada wants to make as loud a noise as possible, but speed of muscle contraction is limited		

Encouragingly, both of these boxes in the Matrix give a clear steer towards the utilization of curvature (Principle 14). The buffering concept is present in Principle 9 (Prior Counter-Action). Interesting also is the presence of Principles 3 and 4, Local Quality and Asymmetry respectively in both boxes. A close-up view of a cicada tymbal swiftly reveals it to be a structure that has made extensive use of both strategies in the overall shape and more specifically in the extensive use of ribbing:

It is very likely that this ribbing contributes both to the increasing the amount of noise generated and reducing the amount of energy needed to make the tymbal flip from it's convex to its concave shape. There is in all probability the additional advantage that the ribbing will help to simultaneously maximize the strength and minimize the amount of material required to achieve the desired function.

Expect to see more 'record-breakers' in future features.

Reference

1) Pringle, J.W.S., 'The Evolution Of Fibrillar Muscles In Insects', The Bidder Lecture, Journal of Experimental Biology, 94, pp1-14, 1981.

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Short Thort

"Management is doing things right, leadership is doing the right things."
Peter Drucker

"Lean/SixSigma are about doing things right, TRIZ is about doing the right things."
Anon

News

North Down
We are very happy to be involved in the launch of the Entrepreneur's Club initiative at North Down college in Nerthern Ireland. We will be co-hosting three days of activities at the College with friend and NLP-collaborator Cora Robinson. Find out more details here: http://www.northdown.gov.uk/news_detail.asp?id=142&area=4&aName=council

Taiwan
We are also happy to welcome Pitotech as the latest member of our reseller community. The company is a well-known provider of high-end software products to the technical and business community in Taiwan. They will be helping us to spread the use of the Chinese language versions of our Matrix+, EvPot+ and other software tools. Our first joint presentation will take place at the 1st Taiwan TRIZ conference, to be held in Taipei on October 21. Check out the Pitotech offering at www.pitotch.com.tw.

Lit-rit-cha
Design for wow in literature collaborator (and sister) Melissa Mann is taking our analytical work on what makes people experience a 'wow' reaction when they read a book a step further in a living experiment on her www.melissamann.com website. Here's a chance to test the 'wow'-equals-contradiction-resolution theory in the 'creative writing challenge'. Visitors are asked to provide a theme ('field' or 'source of energy') and two nouns ('substances') and Melissa will turn them into an award-winning (possibly!) short story or poem.

Contradiction Parameter Search
On the home page of our website you'll see a new feature to help people to make better use of the TRIZ Contradiction Matrix tools. The parameter search tool allows users to enter a word that they are trying to match onto the Matrix. The tool then suggests the best match onto one of either the technical, business or software Matrices. The big idea is that the tool will evolve over time, so that every time someone finds a word not in the tool we will add that word to the database. The win for you is that you get to use the Matrices more effectively. The win for us is it takes us a step closer to being able to automate our contradiction finder tool.

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Inaugural Asia Pacific Value Convention 2006
We have a paper being presented at this prestigious event being convened in Hong Kong on 2 and 3 November. The theme of the conference is innovation, managing value, risk and relationships. Our paper is titled 'Using Technology and Business Trend Knowledge to Systematically Accelerate Innovation'. It offers what we think is a good summary of the way we have been teaching the trends on workshops this year, essentially putting a script to the pictures we show. The paper will be presented by Hong Kong based collaborator, Eric Spain. As soon as we can we will make a copy of the paper downloadable from our website. The conference website, in the meantime, can be found at www.hkivm.com.hk.

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